
Sense Creative! The Impact of Global and Local Vision, Hearing, Touching, Tasting and Smelling on Creative and Analytic Thought

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Abstract

Holistic (global) versus elemental (local) perception reflects a prominent distinction in psychology; however, so far it has almost entirely been examined in the domain of vision. Current work suggests that global/local processing styles operate across sensory modalities. As for vision, it is assumed that global processing broadens mental categories in memory, enhancing creativity. Furthermore, local processing should support performance in analytic tasks. Throughout separate 12 studies, participants were asked to look at, listen to, touch, taste or smell details of objects, or to perceive them as wholes. Global processing increased category breadth and creative relative to analytic performance, whereas for local processing the opposite was true. Results suggest that the way we taste, smell, touch, listen to, or look at events affects complex cognition, reflecting *procedural embodiment effects*.

Keywords

creativity, social cognition, categorization, achievement, automatic/implicit processes

People can perceive the world in fundamentally different ways: as the proverb says, they can focus on the forest or the trees. Whereas the former illustrates a holistic or *global* processing style, the latter reflects a more detail-oriented or *local* processing style. The distinction between holistic and elemental approaches was captured long ago in philosophy (Kant, 1781) and has recently received a lot of attention across psychological disciplines (Förster & Dannenberg, 2010). Within social cognition, this distinction has become one of the most fundamental because it is related to person perception, reflecting differences between stereotypical versus individualistic information processing (see Fiske & Taylor, 2008). Furthermore, it is one of the prominent factors that can influence creative thought within the social context (Friedman & Förster, 2010). The phenomenon is best exemplified with the classic computerized task by Navon (1977), which presented large letters made up of small letters (Figure 1) to participants. The speed with which the participants could identify global or local letters served as a valid measurement of local versus global processing.

It is important to note that personality and cultural differences can determine people's focus of attention. For example, attention to the large letters has been shown to be pronounced in people from collectivistic rather than individualistic cultures (Kühnen & Oyserman, 2002), whereas a pronounced local focus on the small letters can be found in autistic people

(Wang, Mottron, Peng, Berthiaume, & Dawson, 2007) or those with anxiety disorders (Mikulincer, Kedem, & Paz, 1990).

Moreover, beyond stable personality factors, certain situations in which people spontaneously adopt either local or global processing were identified. To name some examples (for a review see Förster & Dannenberg, 2010), global processing is pronounced when people feel happy rather than sad (Gasper & Clore, 2002), when they think of their distant future rather than the present (Lieberman & Förster, 2009), when they focus on their ideals compared to duties (Förster & Higgins, 2005), when their right brain hemisphere is predominantly activated (Derryberry & Tucker, 1994), when people think of love compared to sex (Förster, 2010; Förster, Epstude, & Özsel, 2009), or when they are exposed to novel as opposed to familiar events (Förster, Liberman & Shapiro, 2009).

And as if that were not enough, some researchers (Derryberry & Tucker, 1994; Friedman & Förster, 2010) argued that the mechanisms which drive *perceptual attention* are directly related to mechanisms that drive *conceptual attention* or the

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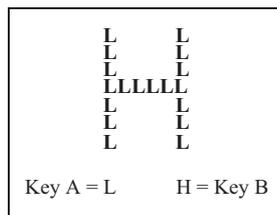


Figure 1. Sample item from the Navon-letter-task (Navon, 1977).

broad or narrow activation of concepts in memory (Neill & Westberry, 1987; Posner, 1987). For example, when viewing a mountain scene, attention may be directed narrowly (e.g., to the rocks, the goats, the flowers alone) or broadly (e.g., to the scenery as a whole). Such differences in perceptual breadth resemble differences in conceptual breadth, when people think of the concept “mountain.” Similar to perception, conceptual attention may be directed narrowly (e.g., activating close associates of mountain such as “goat” or “rock”) or broadly (e.g., activating also remote associates such as “fitness” or “global warming”). The broader the conceptual attention, the more extensive the activation is in memory. Activation of remote exemplars, however should further support among others the generation of creative ideas (Friedman & Förster, 2010). For example, the chef who invented “basil ice cream” may have profited from the activation of remote exemplars to the category of desserts such as “herbs.”

In contrast, many analytic tasks typically profit from a systematic focus on the information given. Here, performance should be supported by a narrow focus on relevant concepts and employing deductive reasoning to draw conclusions from given information (Amabile, 1996; Schooler, Ohlsson & Brooks, 1993). For example if you have to solve syllogisms of the sort “If $A < B$ and $C > B$ then ?” then a broadening of attention that brings to mind material that is not directly associated with the premises given and their logical implications could only distract you from performing the task (Friedman & Förster, 2000). Note that there are some tasks that are called “analytic” or “creative” that may profit from both processes. For example, the slightly positive correlation between intelligence and creativity (see Getzels & Jackson, 1962) may be due to the fact that many so-called analytic tasks also profit from divergent thinking. However, many of them may only suffer from activation of remote exemplars and may profit from narrowing down on relevant information. So far, there is no research showing a direct link between local processing and analytic task performance. In the following studies, we will for the first time examine such a link.

However, recent research shows that in fact perceptual breadth can affect conceptual breadth (Friedman, Fishbach, Förster & Werth, 2003). In one study, participants were instructed to either look at the Gestalt of U.S. state maps (inducing global processing) or look at a specific detail of the same maps (inducing local processing). In an allegedly unrelated subsequent creativity task, participants were asked to generate

the most unusual exemplar for a number of categories (colors, birds, fruits, etc.). Results showed that participants who watched the map globally created more atypical exemplars than participants who looked at the details. One may conclude that the two varieties of perceptual and conceptual attention differ in content but actually share the psychological mechanism of global/local processing.

According to Förster & Dannenberg’s (2010) GLOMO^{sys} (the GLObal versus LOcal processing MOdel, a systems account) global versus local processing can be conceptualized as fundamental content-free ways of perceiving the world and are represented in procedural memory (Tulving & Schacter, 1990; Wyer & Xu, 2010). Such processing styles can carry over to other, unrelated tasks, without participants’ awareness (i.e., procedural priming; see Förster & Liberman, 2007; Smith, 1989; Wyer & Xu, 2010). Schooler (2002) described such phenomena as “processing shifts” which can be transfer-appropriate or transfer-inappropriate. During transfer-appropriate processing shifts, residually activated procedures are beneficial for subsequent processing, whereas transfer-inappropriate shifts result when the elicited procedures impair subsequent processing.

GLOMO^{sys} predicts global versus local processing shifts based on two psychological systems, glo-sys and lo-sys that deal with extracting the global meaning of stimulus sets or with focusing on the constituting details, respectively. If one processing mode is active, it stays and impairs or facilitates subsequent task performance. Only if it is judged to be not sufficient any more, the alternative system will take over. For example, when people encounter a stranger, usually a global processing style is elicited that allows for a broad understanding of the person (it is a man, a woman, etc.; Förster et al., 2009; see also Fiske & Neuberg, 1990). If from the perspective of the perceiver, global understanding is not sufficient any more, because she wants to know more about individual details, lo-sys is activated (see Förster, Marguc & Gillebaart, 2010, see also Fiske & Neuberg, 1990). This model is supported by neural data (see Förster & Dannenberg, 2010); in addition, experimental research on attentional shifts within the Navon task (Ward, 1982), processing shifts across tasks (see Förster & Dannenberg, 2010), and across sensory modalities (Förster, 2001) supports the general notion. The facilitative influence of global processing on creativity is then a by-product of activated broad categories in memory that allow for activating remote exemplars and including them to the category (e.g., including basil to the category of sweets). In contrast, local processing facilitates analytic thought via narrowed categories that allow for concentrating on the details (Schwarz & Bless, 1992, 2007).

Moreover, within GLOMO^{sys}, global versus local processing reflects a basic distinction that may also hold for other sensory modalities. People can for example listen to the whole or to parts of a song, they can try to identify the ingredients of a dish or taste the entire composition, they can attempt to smell the single components of a perfume or try to enjoy the entirety of the aroma and they can touch the details or the whole of an

object. So far, however, research on percept/concept links focused only on visual global/local processing. In the following 12 experiments, we want to fill this void and explore whether watching, touching, tasting, smelling, or listening globally versus locally influences complex cognition. In all experiments, in an initial priming phase, we induced the respective processing styles in unobtrusive ways and tested their influence on category breadth and creative versus analytic thinking.

Experiments

Method

Participants and design. For each of the 10 main studies, 60 different undergraduate students (number of females in the studies: Study 1: 39; Study 2: 30; Study 3: 29; Study 4: 26; Study 5: 38; Study 6: 32; Study 7: 30; Study 8: 30; Study 9a: 35; and Study 10a: 28) were recruited for a 1-hour experimental session including “diverse psychological tasks.” In Studies 9b (31 females) and 10b (25 females), 45 undergraduates took part. Gender had no effects. Participants were paid 7 Euros or received course credit. All studies were based on a 3 Priming (global, local, and control) between-factorial design.

Procedure

Because the procedure across studies was very similar, we first describe the general procedure and then turn to the details.

General procedure. In all studies, participants were told that they would work on two different, unrelated tasks. Thus, in the following studies, participants were initially asked to do an alleged “evaluation” or “perceptual recognition” task in which they had to find letters (Studies 1 and 6), to rate a poem (Studies 2 and 7), food (Studies 4 and 9), aromas (Studies 5 and 10) or in which they had to recognize a form by touching it (Studies 3 and 8). During this first phase, global versus local processing was induced. Exceptions made by Studies 1 and 6, inducing visual processing styles, participants were blindfolded to exclude mediation by visual attention. Later, participants were asked to do an alleged unrelated task which was either a “categorization task” (Studies 1-5), or a “cognitive performance task” (Studies 6-10). Because processing styles have been related to emotions (Gasper & Clore, 2002), moods were assessed (via PANAS; Watson, Clark, & Tellegen, 1988) before the induction, directly afterward and after the test phase.

At the end of the entire session, participants were debriefed; none of them saw any relation between the two phases. We also explained the distinction between global and local processing to participants, and asked them to what extent they focused on details versus the whole during the testing phase on scales anchored at 1 (*not at all*) and 7 (*very much*). Ratings did not differ across conditions in any of the studies, all $F_s < 1$. We now describe the different inductions and dependent measures in detail.

The Independent Variables

Vision (Studies 1 and 6). Participants worked on the computerized Navon-letter-task as used by Förster (2009b) in which a series of global letters (2.5×2.5 cm) made up of local letters (0.5×0.5 cm) are presented. Upon presentation of a fixation cross (“+”) in the center of the screen for 500 ms, 1 of 8 global composite letters (e.g., an “H” made of “F”s; an “L” made of “H”s; an “F” made of “H”s; an “F” made of “L”s) was randomly presented, and participants were instructed to press one response key if the stimulus contained the letter “L” and to press a different response key if the stimulus contained the letter “H.” Participants were asked to respond as quickly as possible. For the global (local) priming condition, Ls and Hs were always the global (local) letter (48 trials); in the control condition, targets occurred as both, small and large letters (24 local and 24 global trials).

Hearing (Studies 2 and 7). Participants were seated behind a computer in an individual booth and were asked to evaluate a poem in an alleged “foreign” language that was actually written in a fantasy language presented via headphones. In the global priming condition, the reading focused on the melody and the sound of the poem; whereas in the local priming condition, it contained many emphases, interruptions, and breaks. The control condition included both integral and disjointed passages. Pretests (reported in Förster, 2011) revealed that the versions did not differ in valence but triggered a focus on details (local), the entire poem (global), or both (control) as reflected in participants’ descriptions of the poem afterward. Upon listening, participants were asked to evaluate the presentation and the task on several dimensions (e.g., difficult, active, beautiful, emotional, cold, lively, warm, boring) on scales anchored at 1 (*not at all*) to 7 (*very much*).

Touch (Studies 3 and 8). Seated in individual booths, participants were told to recognize an object by touching it for 45 s but without seeing it which was placed in front of them on the desk. This “object” was a plastic square that consisted of four square plastic boxes (each $8 \times 8 \times 5$ cm) taped to a cardboard foundation. In the global condition, the plastic bowls were taped closely together; whereas in the local condition, the plastic bowls were taped to the cardboard in a square with 10 cm between them, representing 4 smaller objects. Because one may argue that this paradigm is confounded with size, for half of the participants we introduced a larger object made of larger boxes (each $15 \times 15 \times 5$ cm in size). Size had no effects. Pretests (as reported in Förster, 2011) showed that the versions did not differ in general evaluations (e.g., valence, difficulty), however when experts observed their behavior, they found participants in the local condition to use more time in grasping the details than participants in the global condition who touched the entire gestalt for a longer period (i.e., surrounded with their fingers more on the outer shapes, see Förster, 2011). Upon completion, participants indicated what they had felt and responded to several questions related to the task and the touching experience (e.g., difficult, sharp, beautiful, emotional, cold,

nice, interesting, boring) on scales anchored at 1 (*not at all*) to 7 (*very much*).

Taste (Studies 4, 9a-b). Participants were instructed to examine the quality of different breakfast cereals. They were first interviewed about allergies and food aversions, participants mentioning any problems with the stimulus materials were excluded from the experiment and replaced with others. Participants were told that some samples they would have to test could be very similar. Based on pretesting corn flakes, honey pops, raisins, and crunchy oats were used which were rated as equally pleasant, were liked by most participants, and tasted equally good both in combination with the other ingredients and alone. After every food intake, participants were offered a glass of water.

In Study 9a, in the global condition, participants were presented with four small bowls (approximately a mouthful) containing a mixture consisting of the four different kinds of cereals. In the local condition, participants were presented with four small bowls, each containing one of the four different ingredients. In the control condition, they had to eat two bowls of mixes and two bowls with pure ingredients (raisins and crunchy oats) in random order.

In Study 9b, to avoid a potential confound with simultaneous versus subsequent presentation, participants in the global condition were handed either two balanced samples with the mix of all ingredients; whereas in the local condition, they received two samples with a mix in which one ingredient stood out (the raisins or the honey pops); a control group was not primed.

Pretests (see Förster, 2011) had shown that the two slightly different paradigms did not produce any differences and that conditions did not differ in valence however, participants' written descriptions on which contents they attended to during the tasting (as judged by experts) showed that locally primed participants focused more on details than the control group or the global condition.

Upon completion of this task, participants indicated on a computer, what they thought they had consumed and evaluated the task and the food on several dimensions (e.g., difficult, interesting, yummy, bad, exciting, boring, innovative, fresh, spoiled) on scales anchored at 1 (*not at all*) to 7 (*very much*).

Smell (Studies 5, 10a-b). Participants were seated in individual booths and were instructed to recognize materials by smelling them. A pretest reported in Förster (2011) led to the choice tangerines, fresh soil, and chocolate, which were rated as easily recognizable and neutral to positive in valence (both when given as a mixture but also when given alone). After each trial, participants were asked to wait 1 minute before smelling the next sample.

In Study 10a, in the global condition, participants were presented with three small bowls containing a mixture of all three components; whereas in the local condition, the participants were presented with three small bowls, each containing one of the three different ingredients. In the control condition, they had to smell two bowls of mixes and two bowls with pure ingredients (tangerines and soil) in random order.

In Study 10b, to avoid confounds with simultaneous versus subsequent presentation, participants in the global condition

were handed either three balanced samples with the mix of all ingredients; whereas in the local condition, they received three samples with a mix in which one ingredient dominated; the control group was not primed.

Pretests (see Förster, 2011) had shown that in both paradigms, conditions did not differ with respect to evaluations, however, participants' written descriptions on what they focused on while tasting indicated that locally primed participants attended more to details than the control group or the global condition.

In the actual study, upon completion of this task, participants indicated on a computer what they thought they had smelled and evaluated the task and the aromas on several dimensions (e.g., difficult, interesting, good, exciting, boring, innovative, fresh, heavy, strong, light) on scales anchored at 1 (*not at all*) to 7 (*very much*).

Summary of the inductions. To summarize, manipulations of global/local perceptual processing across sensory modalities were used to test its influence on conceptual breadth. Notably, such inductions have been used before by Förster (2011) who showed cross-modal processing shifts. For example, using exactly the same haptic, auditory, gustatory, or olfactory inductions as described here he demonstrated influences on visual global/local perception in a Navon-like task although the relation between priming and test phase was unknown to participants. He could also show that a visual priming as used in Study 1 carried over to global/local grasping, listening, tasting, and smelling. To illustrate, having watched global letters led participants to grasp the whole of a stimulus set (boxes as used in Study 3) to listen to the global meaning of a poem and to taste and scent the global aspects of food and aromas rather than the details or ingredients. All paradigms have been pretested against potential confounds such as differences in liking, difficulty, size (see Studies 3 and 8), spatial frequency, fluency (ease of processing or understanding), or complexity to name a few (Förster, 2011). Note, for example that in Förster (2011), local auditory presentations were not necessarily easier to process or to understand (in Study 2 or 7, there was actually nothing to understand, and in general, emphasis in many cases should increase rather than reduce comprehension), and tasting or smelling ingredients as opposed to mixes is neither more or less fluent, complex, or difficult—at least as reflected in self-reports. However, admittedly, these studies are just a starting point and certainly, such paradigms should be improved in the future and the discriminant validity of the inductions should be more carefully tested.

Förster's (2011) studies already attest to a multimodal relation across senses with respect to processing styles. Here, we explore whether such inductions have similar consequences for *conceptual breadth*.

The Dependent Variables

Breadth of categorization (Studies 1-5). The categorization task (see Rosch, 1975) consisted of four category names (*furniture, vehicle, vegetable, and clothing*), each followed by nine items.

Three of these items were fringe exemplars of the category, three were good, and three were moderately good exemplars. Participants were asked to rate the goodness-of-fit of each exemplar to the respective category (*How typical is X for the category of Y?*) on a 10-point scale (0 = *not typical* to 9 = *very typical*). Ratings on the fringe exemplars reflect changes in conceptual breadth. However, good and moderately good exemplars should show no effects, since such items should be included in any event.

Creative and analytic tasks (Studies 6-10). Participants were instructed to do a commonly used creative task (e.g., Friedman et al., 2003) and an analytic task (e.g., Friedman & Förster, 2000). More specifically, for the creative task, we handed out a cartoon picture with a dog sitting on a sofa and asked participants to find the most creative title for it. They had 2 min to finish the task. Four experts who were blind to conditions later rated the creativity on a 7-point scale (1 = *not creative at all* to 7 = *very creative*), interrater reliability was high (Cronbach alphas for visual, .85; auditory, .85; haptic, .87; gustatory, .92; 9b: .86; and olfactory, 10a: .89; 10b: .89). For the analytic task, participants worked on four logic problems from the analytical reasoning section of the GRE (in the form of “If $A < B$ and $C > B$ then?”) for which they had 4 min to solve them (Friedman & Förster, 2000). These problems involved evaluating the truth value of a number of propositions, given an initial set of basic facts.

Creative and analytic tasks were given in random order to participants; order had no effects. In all experiments, as expected, performance on the creativity task was negatively correlated with performance on the analytic task, visual, $r(60) = -.62$; auditory, $r(60) = -.58$, haptic, $r(60) = -.83$, gustatory, 9a: $r(60) = -.76$; 9b: $r(45) = -.47$; and olfactory, 10a: $r(60) = -.81$; 10b: $r(45) = -.56$, showing that the tasks profit from opposite processes.

In all Studies 1-10, in order to rule out differences in motivation caused by the inductions on the different tasks, participants were asked to evaluate the tasks on several dimensions (*How much did you like the task? How difficult did you find the task? and How important did you find the task?*) anchored at 1 (*not at all*) and 7 (*very much*).

Results

Category Breadth (Studies 1-5)

Separate 3(Typicality) \times 3(Processing Style) analyses of variance (ANOVAs) were conducted. As predicted, the two-way interactions were all significant, $F(4,114) =$ visual 6.61; auditory 5.70; haptic 8.13; gustatory 7.01; olfactory 5.43; all $ps < .001$. Across the different modalities, global processing enhanced the acceptance of atypical category members compared to the control groups, whereas local processing reduced it (see Figure 2A-E for means and further statistics). There were no effects for the more typical category members in any of the studies, $F_s < 1$, ruling out the possibility of response biases at work. These five studies are first evidence that effects of

perceptual focus on category breadth occur across sensory modalities. Such variations in category breadth should also affect creative versus analytic thought.

Creative versus Analytic Thought (Studies 6-10)

For the creativity task, average creativity as rated by the four judges served as the dependent variable. For the analytic task, number of correct solutions was used for measuring performance. According to separate ONEWAYs, across sensory modalities, creativity was enhanced in the global conditions and was reduced in the local conditions if compared to the control group (Figure 3A-G); for analytic performance, however the opposite was true (Figure 4 A-G). We also subjected z transformed values of analytic versus creative performances to 2 (Creative; Analytic) \times 3(Processing Style) ANOVAs; as predicted, the two-way interactions were all significant, $F(2,57) =$ visual, 12.40; auditory, 12.62; haptic, 9.74; gustatory 9a, 13.58; olfactory 10a, 10.45; and $F(2,42) =$ gustatory 9b, 15.28; olfactory 10b, 15.02; all $ps < .001$. These findings show that none of the processing styles enhanced performance in general; instead, a local processing style supported analytic thought, whereas global processing enhanced creative performance.

Mood, Motivation, Task Evaluations

For each single experiment, we conducted ONEWAYs to examine effects on moods, or evaluation of the tasks or inductions. There were no significant effects, all $F_s < 1$. Thus, our effects were unlikely to be caused by different mood states or feelings, task motivations, or difficulties experienced.

Final Remarks

Twelve studies reflect the importance of gestalt versus detail perception underlying complex cognitive operations. Such distinction operates across sensory modalities. The way we watch, touch, taste, listen, or smell seems to affect our cognitive processes in an automatic way, predicting how creative or analytic we are, or how openly or narrowly we construe mental categories. These findings fit well with GLOMO^{sys} that predicts such carryovers of global versus local processing styles based on two psychological systems: Activating glo-sys broadens conceptual scope, whereas activating lo-sys narrows it. As a by-product, creative and analytic tasks are affected. Within GLOMO^{sys}, it does not matter which sensory modality activates the respective systems. The studies inform us about underlying processes with respect to the effect of global/local processing on creative thought. One could have for example reasoned that in Friedman, Fishbach, Förster and Werth. (2003) participants who looked at state maps globally, attended to *more diverse* information, thereby activating more concepts in memory. The current studies show however, that such process is not necessary to get the effects, rather it is sufficient for example to activate glo-sys by touching the gestalt

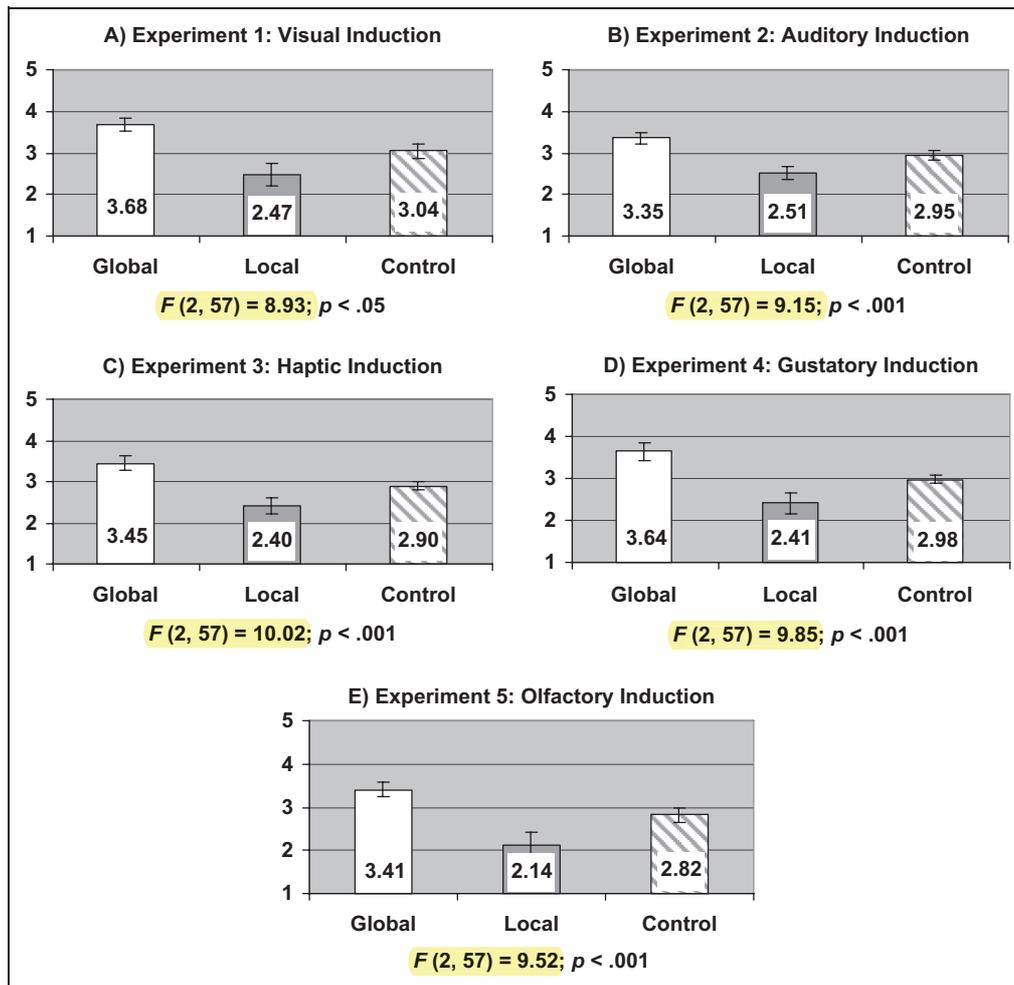


Figure 2 A-E. Mean typically ratings as a function of processing styles across different modalities. Statistics below the panels indicate the main effect. Numbers represent means. Bars represent \pm SE. Each single contrast within one panel differs at $P < .05$. NOTE: SE = standard error.

of an object that is made of similar smaller objects or to eat the same food—just in a different manner. We conclude that any purely visual process one could imagine falls short to explain the results of our studies.

Taking a different perspective, these findings are highly consistent with recent embodiment approaches within social psychology, predicting strong links between perception and cognition (Barsalou, 1999). Embodiment research has shown for example that perceiving objects at the top versus at the bottom of a computer screen leads to inferences of high versus low power (Schubert, 2005), that inducing a smiling face in unobtrusive ways leads to higher funniness ratings of cartoons (Strack, Martin & Stepper, 1988), and that holding heavy versus light clipboards leads to inferences of high versus low value of attached texts (Jostmann, Lakens & Schubert, 2009). Notably, in most of these studies, the perceptual content was related to higher cognition in a direct semantic or metaphorical way (Lakoff & Johnson, 1980). Our studies however, show a relation on the *processing* rather than the *content* level, and thus represent more *procedural* priming than *semantic* priming effects (see Wyer, 2010; Wyer, Shen & Xu, in press).

Importantly, in our studies, the content in the priming phase was equal for all participants in that all participants were exposed to the same letters (Studies 1 and 6) or consumed the same food (Studies 4 and 9)—it was the manner of processing that differed and drove effects. Future research may make use of such notion of *procedural embodiment*. Do for example power holders differ from the powerless in *the ways* they listen to information or touch or smell events? Would looking at black-and-white pictures lead to a perception of content-wise unrelated dichotomies in the environment?

Our findings may have implications for our daily behaviors. Some objects or people in the real world may unconsciously affect our cognition by triggering global or local processing styles; while some may naturally guide our attention to salient details (e.g., a spot on a jacket, a strong scent of coriander in a soup), others may motivate us to focus on the gestalt (e.g., because they are balanced and no special features stand out). It might be the case then that differences in the composition of dishes, aromas, and other mundane events influence our behavior. We might for example attend more to the local details of the answers by an interview candidate if he wears a bright

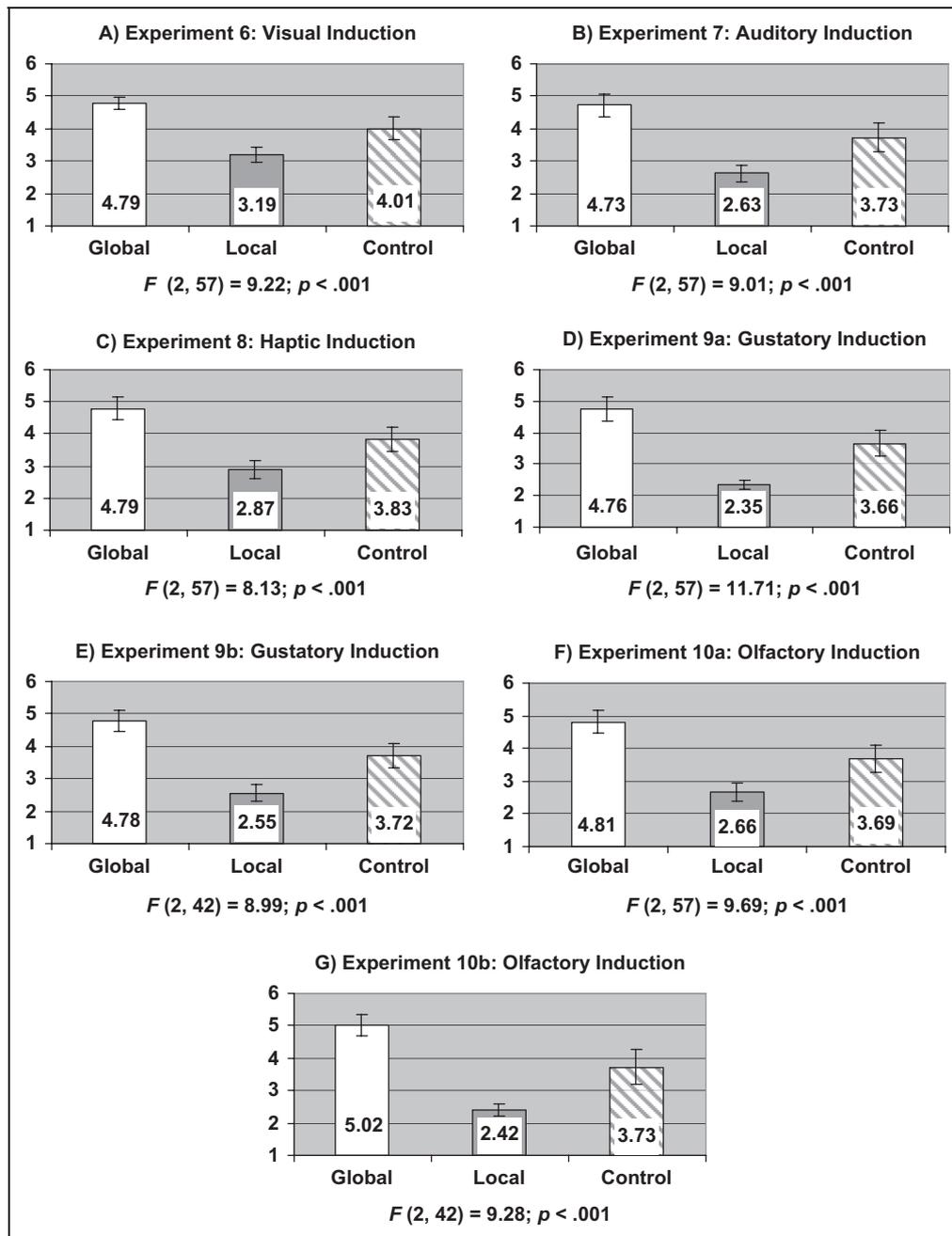


Figure 3 A-G. Mean creativity ratings as a function of processing styles across different modalities. Numbers represent means. Bars represent \pm SE. Statistics below the panels indicate the main effect. Each single contrast within one panel differs at $P \leq .05$. NOTE: SE = standard error.

pink tie, or we may start to become more creative upon tasting a balanced wine. This is because our attention to details versus gestalts triggers different systems that process information in different ways.

While recent research focused mainly on the benefits of global processing on a variety of variables (see Förster & Dannenberg, 2010), our results show for the first time systematic benefits of local processing on analytic performances. Global processing has also been theorized to have negative consequences in the interpersonal domain such as when people

fail to appreciate the individual details of others (Fiske & Neuberg, 1990). One may then wonder whether the way we eat or taste or touch is related to stereotyping or person perception. Furthermore, future research may examine whether it would help minorities to present their messages in a way that leads the listener to the details, in order to prevent for stereotyping.

Future research may also examine whether we can consciously make use of this insight. Could we force ourselves to grasp our pen in a local manner and thereby increase our math performances? Could we also correct for unwanted

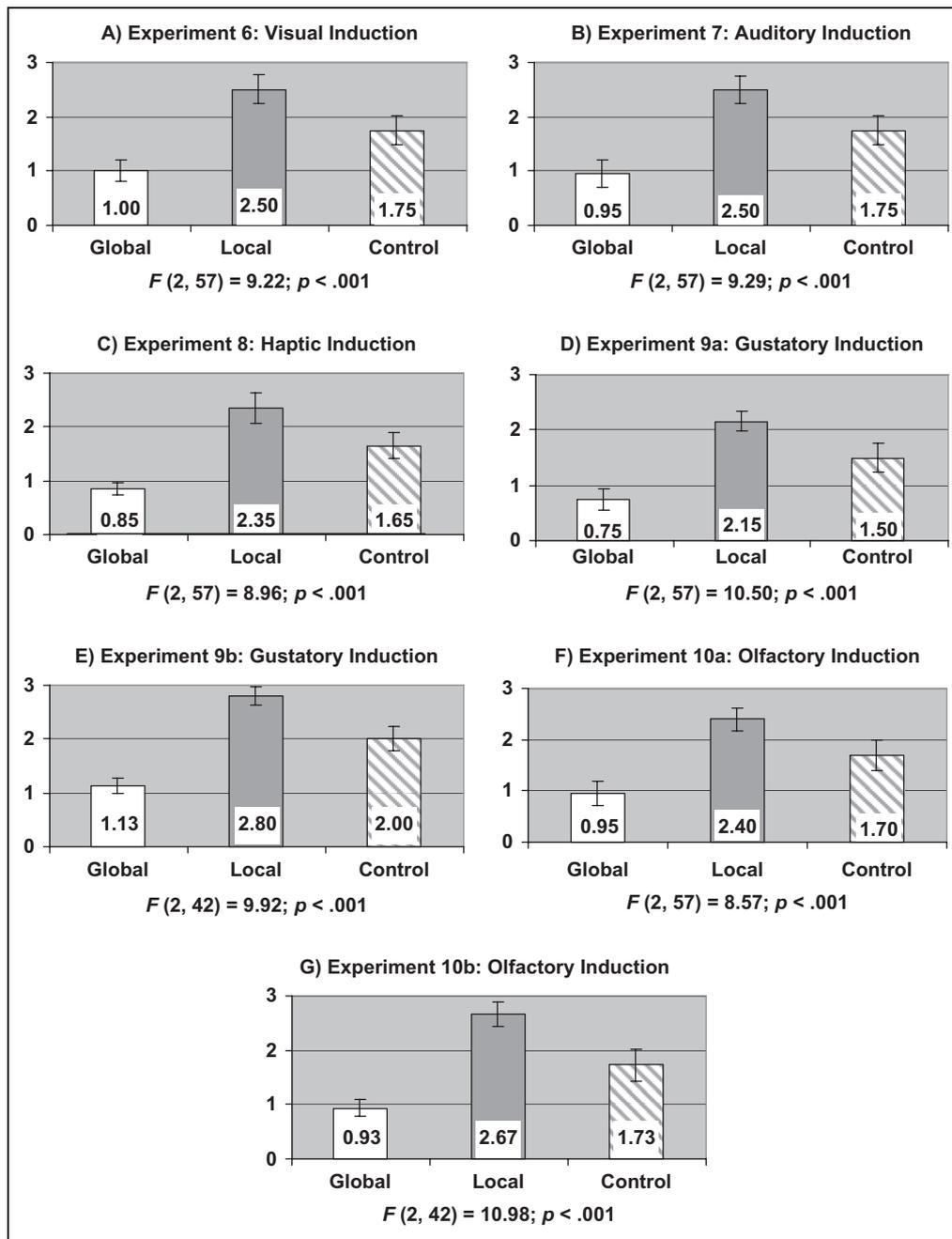


Figure 4 A-G. Mean analytic performance as a function of processing styles across different modalities. Numbers represent means. Bars represent \pm SE. Statistics below the panels indicate the main effect. Each single contrast within one panel differs at $P \leq .05$. NOTE: SE = standard error.

influences (Wyer & Xu, 2010)? If I, for example, realize that I am listening too locally which impairs my creativity, can I switch to global listening and would this have an effect? We hope we have opened the doors for much more of this type of research which studies basic processing styles beyond the visual one.

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